TABLE 2.—*Free-air resultant winds (m. p. s.) during January, 1927*

Altitude (m.) m. s. l.	Broken Arrow, Okla. (233 meters)				Due West, S. C. (217 meters)				Ellendale, N. Dak. (444 meters)				Groesbeck, Tex. (141 meters)				Royal Center, Ind. (225 meters)				Washington, D. C. (34 meters)			
	Mean		9-yr. mean		Mean		6-yr. mean		Mean		10-yr. mean		Mean		9-yr. mean		Mean		9-yr. mean		Mean		7-yr. mean	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface	S. 76°W.	0.8	S. 49°W.	1.1	N. 36°W.	1.2	N. 74°W.	1.1	S. 87°W.	3.7	N. 63°W.	2.9	S. 18°W.	3.4	N. 68°W.	0.5	S. 41°W.	1.3	S. 51°W.	1.9	N. 47°W.	2.1	N. 36°W.	1.7
250	S. 73°W.	0.9	S. 41°W.	1.2	N. 51°W.	1.1	N. 77°W.	1.3					S. 59°W.	1.8	N. 78°W.	0.6	S. 44°W.	1.7	S. 50°W.	2.3	N. 63°W.	3.6	N. 65°W.	3.3
500	S. 55°W.	2.2	S. 36°W.	2.4	N. 71°W.	2.4	W.	2.6	S. 88°W.	4.7	N. 68°W.	3.5	S. 52°W.	4.1	S. 59°W.	1.8	S. 51°W.	4.1	S. 60°W.	5.0	N. 63°W.	6.0	N. 71°W.	5.5
750	S. 63°W.	2.2	S. 41°W.	3.0	N. 73°W.	3.2	S. 84°W.	4.0	N. 79°W.	7.1	N. 67°W.	5.5	S. 56°W.	5.3	S. 61°W.	2.9	S. 65°W.	5.7	S. 66°W.	6.6	N. 62°W.	6.6	N. 71°W.	7.2
1,000	S. 72°W.	3.4	S. 58°W.	3.6	S. 80°W.	5.1	S. 81°W.	5.5	N. 73°W.	7.3	N. 63°W.	6.7	S. 60°W.	6.4	S. 64°W.	3.7	S. 76°W.	7.4	S. 75°W.	7.6	N. 57°W.	7.2	N. 69°W.	8.3
1,250	S. 75°W.	4.4	S. 71°W.	4.2	S. 76°W.	7.2	S. 87°W.	7.6	N. 69°W.	8.4	N. 63°W.	7.8	S. 62°W.	6.5	S. 70°W.	4.8	S. 86°W.	7.9	S. 80°W.	8.7				
1,500	N. 89°W.	5.4	S. 73°W.	5.4	S. 85°W.	8.2	S. 86°W.	9.9	N. 68°W.	9.4	N. 64°W.	8.2	S. 68°W.	6.3	S. 74°W.	5.8	N. 85°W.	9.7	S. 84°W.	9.9	N. 71°W.	7.8	N. 68°W.	10.1
2,000	S. 86°W.	7.1	S. 82°W.	7.3	S. 85°W.	10.3	S. 87°W.	12.5	N. 64°W.	11.1	N. 65°W.	10.8	S. 89°W.	6.1	S. 79°W.	7.2	N. 85°W.	11.0	S. 85°W.	11.6	N. 65°W.	8.9	N. 72°W.	11.5
2,500	N. 87°W.	9.0	S. 87°W.	8.8	W.	11.8	S. 89°W.	15.2	N. 63°W.	13.6	N. 66°W.	12.9	N. 59°W.	7.4	S. 81°W.	8.6	N. 86°W.	11.6	W.	13.2	N. 56°W.	9.6	N. 80°W.	13.9
3,000	S. 85°W.	11.6	N. 89°W.	10.2	S. 87°W.	14.8	S. 87°W.	16.6	N. 56°W.	15.5	N. 67°W.	14.4	N. 52°W.	9.1	S. 82°W.	10.1	N. 88°W.	15.3	S. 89°W.	13.9				
3,500	S. 88°W.	13.4	N. 86°W.	10.9	S. 77°W.	13.5	S. 84°W.	16.3	N. 76°W.	16.2	N. 68°W.	15.5	N. 33°W.	12.8	S. 84°W.	11.3	S. 87°W.	15.8	S. 83°W.	13.5				
4,000	S. 85°W.	11.0	N. 86°W.	11.3	S. 67°W.	18.0	S. 81°W.	16.2	N. 76°W.	19.2	N. 63°W.	17.0					S. 75°W.	19.1	S. 74°W.	17.4				
4,500									N. 45°W.	29.0	N. 56°W.	19.4					S. 76°W.	20.6	S. 76°W.	20.6				

WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

The month was characterized by greater than the normal atmospheric pressure, the rapid movement of cyclonic systems eastward along the northern border, the rather sluggish movement elsewhere; moderate temperature for midwinter; generally deficient rainfall, except in the upper Ohio Valley and thence southwestward to Oklahoma, where it was normal or above. The snowfall was light to moderate in the middle Atlantic area, the immediate Ohio Valley, the middle Missouri Valley, and in the southwest.

CYCLONES AND ANTICYCLONES

By W. P. DAY

The month was marked by a succession of high-pressure areas of considerable magnitude and mostly of polar origin. Three of these had maximum pressures around 31 inches. On the morning of the 9th high pressure extended from Alaska to southern Mexico, with a crest of 30.92 inches at Miles City, Mont. Again, on the 14th a great HIGH extended from Canada to Central America, with a maximum pressure of 31.10 inches at Rapid City, S. Dak. Later, between the 25th and 28th, a large HIGH moved slowly southeast from the Canadian Northwest to the middle Atlantic States, with several pressure readings as high as 31.06 inches as it passed over the Lake region.

On account of the prevailing high pressure during much of the month, the number of low-pressure areas plotted was reduced to 16 as compared with 23 for December. There were no unusually severe storms.

THE WEATHER ELEMENTS

By P. C. DAY

PRESSURE AND WINDS

The outstanding features of the weather for the first month of 1927 were the unusually high sea-level barometric pressures, 31 inches or above, observed over the north-central districts on the 8th and over central and northeastern districts on the 26th and 27th, the pressure on the latter dates being the highest of record at many stations on the Great Lakes, in portions of the Ohio Valley, and to the eastward; the widespread excess of temparature; and the greatly deficient precipitation over most southern and eastern districts.

The first decade was mainly free from important cyclonic storms, though about the 6th a low-pressure area developed in the middle Plateau and moved northeastward, reaching North Dakota by the 8th, whence it moved southeastward to the Carolina coast by the morning of the 10th, where it again curved to the northeast and passed off the New England coast, reaching Newfoundland by the morning of the 12th. At no point in its long course did this storm reach extensive proportions or give any wide distribution of important precipitation.

At the beginning of the second decade a storm developed in the far Southwest and by the morning of the 13th it was central over Missouri attended by local heavy rains near the center and by snow to the westward and northward. During the following 24 hours the storm moved rapidly to the lower St. Lawrence Valley and widespread rain or snow, mostly light, occurred over nearly all districts from the Mississippi Valley eastward to near the Atlantic coast. Immediately following the passage of this storm, another developed off the coast of southern New England attended by precipitation, mostly sleet or snow, along the entire Atlantic coast from the Carolinas to Maine, some heavy falls of snow occurring in southeastern New York and near-by areas.

Cyclonic disturbances were rather frequent in the central valleys and Southwest during the latter part of the second decade and the first half of the third, during which time important precipitation, mostly rain, occurred over the middle and lower Mississippi Valley and portions of the Ohio Valley as well as lighter falls of both rain and snow in near-by areas; none of these low areas developed important proportions, however, and few persisted as well-defined storms over long courses.

The last half of the third decade had little cyclonic activity, though considerable precipitation occurred from central California northward on the 27th to 29th, and there were widespread, but light rains over the eastern third of the country during the last three days.

Anticyclones rather dominated the weather of the month and persisted to an unusual extent over the Plateau region during the first decade, extending into the districts to the eastward by the end. Early in the second decade an anticyclone of unusual strength moved into the upper Missouri Valley and advanced eastward into the Atlantic coast districts by the 17th, being quickly followed by another over the more northern districts, and rather high pressure persisted for several days over the north-central districts, advancing later to New England, attended by severe cold over the Great Plains

and into central Texas about the 22d. During this period high pressure was developing in the Plateau and Rocky Mountain regions and on the morning of the 25th another high-pressure area moved into the Dakotas. By the next morning it had extended eastward to the upper Lake region as an anticyclone of unusual strength, the pressure rising above 31 inches over a wide central area, attended by minimum tempertures from 40° to 50° or more below zero over the more northern districts from North Dakota eastward. By the morning of the 27th it had advanced to New England without appreciable diminution of strength, the pressure still remaining above 31 inches over the central area, the highest pressure ever observed being reported at numerous points from the Great Lakes and Ohio Valley eastward. This unusual anticyclone moved slightly southward to the middle Atlantic coast during the 28th and rapidly diminished in strength as it drifted eastward onto the ocean.

The average pressure was everywhere higher than normal both in the United States and Canada save over small areas in Oregon and Washington, where it was normal or slightly below. Compared with the preceding month the average pressure was likewise higher in all parts of both countries except in the far West.

There were no persistent and pronounced pressure centers or steep average pressure gradients to influence the prevailing winds over large areas. Severe storms of any character were notably absent for a mid-winter month, though in some northern districts snow drifts blocked traffic on several dates.

The usual statistics concerning severe storms appear at the end of this section.

TEMPERATURE

While the average temperature was mainly above normal there were several periods of severe cold, notably on the 11th and 12th over the Southern States, particularly in Florida, where freezing temperatures occurred in the interior and frosts were reported as far south as Miami. On the 13th high pressure in the northern Plains brought sharp falls in temperature over much of the country adjacent thereto and as it moved eastward and southward severe cold penetrated the more southern districts, freezing temperatures reaching into southern Texas on the 14th and into southern Florida on the 15th and 16th, attended by severe damage to all tender vegetation and considerable damage to citrus fruits and the more hardy vegetables. Several important changes to quite low temperatures occurred over the more northern districts during the latter part of the second decade and the first half of the third, and rather low temperatures extended into central Texas on the 22d and 23d, and about the same time temperatures were decidedly low in the far Southwest, though injurious frosts did not reach into the important fruit and truck regions of California and Arizona.

The important anticyclone entering the Dakotas on the 25th brought the coldest weather of the month during the following two days over all northern districts to the eastward, but severe cold did not develop southward to any great extent until the anticyclone reached the North Atlantic coast districts, when sharp falls in temperature were recorded as far south as the Carolinas and into northern Georgia.

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The highest temperatures were recorded during the first week over nearly all districts from the Great Plains westward, while to the eastward they were mainly observed from the 20th to 22d, though near the Great Lakes they occurred mainly on the 29th and 30th. A few points in the east Gulf and South Atlantic States reported the highest or nearly the highest temperatures ever observed in January on the 22d or 23d.

The lowest temperatures occurred on the 15th and 16th from the central and southern Plains eastward to the Atlantic coast, save that in Virginia and North Carolina they occurred on the 12th. In portions of the northern Plains and from the Rocky Mountains westward they occurred mainly from the 21st to 24th, at which time some of the lowest temperatures of record occurred in the far Northwest. From the Dakotas eastward to the North Atlantic coast the lowest marks occurred on the 26th and 27th.

The average temperature for the month was above normal over the entire country and Canada as well, save for a small area including most of the drainage area of the Great Lakes, and a narrow strip along the immediate Atlantic coast from Key West to Delaware Bay, and at a few points in the far Northwest. Over much of the Southwest, particularly New Mexico and portions of near-by States, the averages were far above normal and in a few instances the means were the highest of record for January. At Santa Fe there were no days with the temperature below normal. Unusual warmth prevailed also in the middle Gulf States and over the Dakotas and near-by Canadian Northwest Provinces.

PRECIPITATION

January as a whole was distinctly dry, only nine States showing average precipitation in excess of the normal. Amounts of precipitation above normal were confined mainly to a narrow area from central Oklahoma and northern Arkansas northeast to and over the Ohio Valley. There was a slight excess over Oregon and at a few points in the middle plateau. In all other districts, precipitation was almost uniformly below normal, and over the Southern and Southeastern States the deficiency was unduly large, the totals at individual points in the Gulf and South Atlantic States being in many cases the least for the month in the 50 or more years of record.

SNOWFALL

There was no unusually wide distribution of snow and the individual falls were not heavy save in a few instances, and these usually covered comparatively small areas.

Over New York and New England about the normal snowfall occurred, the totals for the month ranging locally up to two feet or slightly more. Somewhat less snow was recorded in the Great Lakes region and in portions of Illinois and Indiana. In the remaining sections east of the Rocky Mountains where snow usually falls the monthly amounts were mainly small and usually less than normal.

In the western mountains, snowfall was generally near normal over the northern districts and mainly far less than normal in the more southerly portions.

Individual heavy snows occurred over a considerable area from the middle Mississippi Valley northeast to Michigan on the 13th and 14th, and over the Hudson

Valley and near-by areas on the 15th and 16th. Elsewhere the individual falls were mainly light except for local areas in the western mountain districts, where some heavy falls were recorded. Drifting snow delayed traffic somewhat in portions of New York and near-by areas about the middle of the month, and there was considerable drifting during the month in the northern Plains.

Injurious glaze storms occurred locally in Missouri and in the vicinity of the Ohio River in Illinois and Kentucky, near the first of the last decade, causing important damage to overhead wire systems, orchards, etc.

HUMIDITY

The relative humidity was mainly less than the normal, particularly over the Southeastern States where precipitation was very deficient, and there was mainly less than normal humidity in the Northwest and far West. In portions of the middle Plains and northeastward over the Ohio Valley to New England, there was an excess in the humidity percentages, and similar conditions prevailed in the western upper Lake region and over the upper Mississippi Valley and portions of the Dakotas.

SEVERE LOCAL HAIL AND WIND STORMS, JANUARY, 1927

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
New England coast	11					Wind and snow	Steamer grounded near Rose Island; street car and light service out of commission; highways blocked by fallen wires.	Times (New York).
Illinois	12–13					Snow and wind	Considerable losses to transportation companies; highways blocked by drifts; telephone lines down; icey condition of streets dangerous.	Official, U. S. Weather Bureau.
Whatcom County, Wash. (western part of).	12–13				$27,000	Sleet and wind	Telegraph, telephone, and transmission lines damaged.	Do.
Hudson Valley, N. Y	15					Heavy snow	Traffic impeded	Do.
Ohio	18–23					Heavy rains	Flood conditions resulted. Damage not reported.	Do.
Missouri (southeastern part).	18–24					Rain, sleet, and glaze.	Worst glaze storm in 20 years or more. Public utilities suffer severely; fruit, timber, and small houses damaged by ice; many auto accidents in various parts of the State.	Do.
Tennessee (northwest part).	19–21			4		Heavy rains	Children drowned while crossing swollen stream; no damage to property reported.	Do.
Indiana (middle and southern parts).	20–23					Glaze	Travel difficult; fruit and winter grains damaged.	Do.
Illinois (southern part)	21–23				143,000	do	Area embraced about 20 counties; 98 per cent of damage due to falling limbs and trees; telephone and telegraph companies sustain heavy losses; much injury to commercial orchards.	Do.
Kentucky (north and west).	22–23					do	Extensive damage to wire systems	
Oklahoma	22–24				218,000	Severe sleet and glaze.	Wire systems badly damaged	Do.
Texas (north and west)	22–24					Glaze	Considerable damage to overhead wires, power lines, and trees. Scores of minor accidents reported.	Dallas (Tex.) Morning News.
Pittsburgh, Pa., and vicinity.	23					Rain and glaze	Wires thickly coated; cars run with difficulty	Official, U. S. Weather Bureau.
Milwaukee and Manitowoc, Wis.	29–30				1,000	Wind	Several plate glass windows broken; some signs and outbuildings blown down.	Do.
Buffalo, N. Y	30					Thunderstorm, wind, and hail.	One home damaged by lightning	Do.

STORMS AND WEATHER WARNINGS

WASHINGTON FORECAST DISTRICT

Few storm warnings were required during the month, and they were issued for only three storms. The first were southeast warnings displayed at 10 a. m. of the 4th from Delaware Breakwater to Boston, and at 9:30 p. m. on the coast of Maine, for a disturbance of marked intensity moving eastward with center over Ontario that morning. The highest wind velocity during the ensuing 24 hours was 48 miles an hour from the southeast at Eastport, Me.

On the morning of the 11th a disturbance was advancing northeastward with increasing intensity, with center about 200 miles off the New Jersey coast, and northeast storm warnings were ordered displayed from Block Island, R. I., to Eastport, Me. All stations in this area reported verifying velocities, the highest being 60 miles an hour from the northeast at Nantucket, Mass. On the 15th another disturbance was central in about the same location as that of the 11th, but the following area of high pressure was much stronger and accompanied by a cold wave. Consequently, northwest storm warnings were displayed from Cape Hatteras to Boston at 9 a. m., and northeast warnings north of Boston at 10:30 p. m. Verifying velocities occurred at practically all stations, New York City reporting 60 and Cape Henry 48 miles an hour, both from the northwest.

The last storm warnings of the month were issued under unusual conditions at 9:30 p. m. of the 26th. At that time an area of abnormally high pressure (31.06 inches at Southampton, Ontario), accompanied by a cold wave, was pushing rapidly southward over the Atlantic States. Although there was no low pressure over the East Gulf or South Atlantic States, strong north and northeast winds were indicated for the South Atlantic coast because of the steep pressure gradient from north to south. Therefore, northeast storm warnings were displayed from the Virginia capes to Savannah, Ga. Cape Hatteras reported the highest velocity, 40 miles an hour from the north.

Small-craft warnings were issued for portions of the Atlantic coast on the 1st, 6th, 11th, 15th, and 26th, and warnings of northers in the Panama Canal Zone were issued on the 10th, 14th, and 27th.

Heavy-snow warnings were issued at 3:45 p. m. of the 11th for Rhode Island, eastern Massachusetts, and part of Maine and New Hampshire. The following morning Eastport, Me., reported 5, Boston 7, and Block Island, R. I., 11 inches of snow on the ground.

No cold-wave warnings were required during the first 13 days, and the only general warnings were those of the